

EXHIBIT 11

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UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

)
) Civil Action No.
) 5:16-cv-10444-JEL-MKM
In re: FLINT WATER CASES) (consolidated)
)
) Hon. Judith E. Levy
) Mag. Mona K. Majzoub
_____)

HIGHLY CONFIDENTIAL
Thursday, April 20, 2023

Remote Videotaped Deposition of
ROBERT A. MICHAELS, Ph.D., commencing at 10:01 a.m.,
on the above date before Carol A. Kirk, Registered
Merit Reporter, Certified Shorthand Reporter, and
Notary Public.

GOLKOW LITIGATION SERVICES
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1 I haven't sought to make a formal definition of
2 it. A byproduct is a byproduct, and a
3 disinfection product is something that is
4 somewhat reactive and, therefore, one would
5 expect byproducts.

6 So that's a very general statement
7 of my concept, but I would rather not be too
8 constrained by that.

9 Q. Okay. Sitting here today, can you
10 name any disinfection byproducts that were
11 present or detected in Flint River water that
12 was distributed by the City of Flint in 2014 or
13 2015.

14 A. I don't have a memory of that
15 right now.

16 Q. Okay. Do you recall whether that
17 is noted in your report anywhere?

18 A. Well, if it is, I can look for it.
19 I don't recall specifically.

20 Q. No. Just sitting here now.

21 Okay. Do you agree that the
22 higher the exposure, Doctor, the higher the
23 likelihood of illness.

24 Do you agree?

1 A. Yes.

2 MR. CONNORS: Objection.

3 Excuse me. Objection; incomplete
4 hypothetical.

5 Q. And you agree with the corollary
6 there that the lower the exposure, the lower the
7 likelihood of illness, true?

8 MR. CONNORS: Same objection.

9 A. Let me put it to you in a way that
10 is a little more precise.

11 You understand that I gave -- I
12 presented a generic dose response curve. And
13 that generic dose response curve does actually
14 encompass that concept that you raised.

15 But it also provides an important
16 exception to that, which is that when there is a
17 threshold below which an event -- an illness or
18 whatever won't occur, the dose doesn't have an
19 effect on the incidence. It's a zero incidence.
20 And so the -- I guess that's the only caveat
21 I would put on it right now.

22 Q. Okay. Doctor, you would agree
23 with me then that there are thresholds below
24 which illnesses will not occur, generally

1 speaking, in the toxicology world?

2 A. Well, I will agree with that in a
3 general sense, but I will also put in the caveat
4 that for carcinogens, the extrapolation down to
5 the low dose range, which is below what we might
6 experimentally observe, can go down to a single
7 molecule. And as I have tried to explicate,
8 that's extraordinarily unlikely. A single
9 molecule is extraordinarily are unlikely to
10 cause anything.

11 So if you're talking in principle
12 about causation, every molecule contributes to
13 the total exposure and is significant to the
14 extent that is a part of that.

15 If you're talking about the
16 principle in a one-hit model, that has a finite,
17 although vanishingly small, probability. So
18 this is just toxicology. This is just
19 principles.

20 And I tried to explicate in my
21 reports that in the context of Flint where we're
22 not talking about cancer causation -- and I'm
23 not saying I would rule that out.

24 But what I am saying is that in

1 the context of cancer causation, these
2 conditions or caveats that I've put in are more
3 relevant. In the context of my report, I've
4 tried to emphasize that there are thresholds,
5 even though they may personally vary, among
6 different individuals.

7 Q. Okay. Is there a threshold that
8 you're aware of below which calcium carbonate
9 dissolved in water would not cause or could not
10 cause any illness or adverse effect on skin?

11 A. I have not looked into that
12 question, except to say that it falls into the
13 category of a threshold substance, and
14 therefore, in principle, I would expect there to
15 be a threshold.

16 Q. Same question for free chlorine.

17 A. When considering a single
18 substance at a time, I have the same answer for
19 you. I will, again, emphasize the caveat that
20 you're in a situation where nothing is acting by
21 myself. Everything is acting in concert, both
22 simultaneously and sequentially, with other
23 substances that are present. And so what is the
24 influence of one substance when others are

1 present, hard to say.

2 Q. Okay. Doctor, do you have a count
3 or an estimate of how many rashes were observed
4 to have occurred in the population of Flint
5 during the Flint water crisis, by which I mean
6 the period October -- sorry -- April 2014 to
7 October 2015?

8 A. You're asking me if I have that
9 number?

10 Q. Yes.

11 A. I believe that what I cited for
12 you in my report was a number that came to the
13 attention of people conducting the UCG 2016
14 report.

15 I am fairly confident that that is
16 not a total number of rashes.

17 Q. Okay. So is the answer no for the
18 entire period of -- for the Flint water crisis?

19 A. The answer is the answer. Some of
20 them were found and others were probably not
21 found, almost certainly not found.

22 Q. Okay. Let me try again maybe a
23 slightly different way.

24 Can you tell the jury the number

1 of rash cases occurring in Flint's population
2 from April 2014 until October 2015.

3 A. Can I tell them that number? No,
4 I don't know that number.

5 Q. Okay. Do you have an estimate of
6 the number, if not the point itself or the point
7 number itself?

8 A. I have quoted the estimate of the
9 UCG 2016 which I think -- again, I won't think,
10 but what I will say is that there is an estimate
11 of that in my report in accordance with UCG
12 2016, which is pretty definitive on a subject
13 like that because they're dermatologists who
14 produce it.

15 Q. And what is the estimate? Can you
16 express that for us.

17 A. If you don't mind my going to the
18 report, sure.

19 Q. Please do.

20 Any luck yet, Dr. Michaels?

21 A. Well, I'm looking in my report
22 originally, and I'm pretty sure that it's there
23 somewhere, but I am seeing that there are 88
24 mentions of the word "rashes," and so I -- going

1 through that -- I could go back to the UCG
2 report, which I think contains that number.

3 That was one of the issues that
4 they raised in the report. There was some
5 percent of people who had rashes in the
6 background. And so I just don't remember what
7 that number is right now.

8 Q. Okay. Well, tell you what, we can
9 circle back to it. If it comes to you or if you
10 realize where it is, please let me know during
11 the course of the dep, okay?

12 A. Sure.

13 Q. Are you aware of anyone in Flint,
14 the City of Flint, who did not bathe or shower
15 or otherwise have a skin exposure to the
16 municipal water between May or April 2014 and
17 January 2015 but who was subsequently exposed?

18 Are you aware of any such person?

19 A. Well, no, I'm not aware of any
20 specific individual.

21 Q. Okay. Are you aware of any
22 reports of anyone being exposed for the first
23 time to Flint River water in the period
24 February 2015 to October 2015?

1 approach, which was to contact physicians, and
2 especially dermatologists, to help out with this
3 investigation, in particular because of the
4 elevation of incidence of rashes in the Flint
5 water crisis, not the post-Flint water crisis.
6 That was -- that was not the primary interest.
7 It was the primary thing to do that was
8 feasible.

9 So that is also part of Barkey's
10 repertoire of opinions that I've seen and
11 corroborated by others as well.

12 So I do think that it's pretty
13 clear that the -- that UCG 2016 backed off on
14 studying the Flint water crisis period because
15 of the absence of historic water data that is --
16 if that is along the lines of what you are
17 suggesting.

18 Q. Okay. And you're aware that
19 Dr. Barkey said, "Some would say this was not a
20 scientific study" -- referring to UCG -- "and
21 the findings cannot be automatically applied to
22 the entire Flint community, and they would be
23 right."

24 Are you aware of that statement?

1 A. The UCG study? Yeah, I've seen
2 that as well.

3 Q. On page 8 of your March 2023
4 report, Dr. Michaels, the second paragraph, it
5 begins "54 items." It's below the block quote.

6 Do you see that?

7 A. I do.

8 Q. Okay. You say, "The 54 items
9 cited in my report" -- that's the stuff from the
10 table that we looked at?

11 A. Yes.

12 Q. Okay. "-- include many
13 peer-reviewed studies that support the general
14 causation hypothesis."

15 That's what you wrote?

16 A. Yeah. I'm reading it as you are.

17 Q. What is -- what is the general
18 causation hypothesis? What do you mean by that?

19 A. Well, I'm trying to get away from
20 something you raised earlier, which is specific
21 individuals. And that specific causation issue
22 is really for a clinician to decide.

23 But clinicians can't do that
24 without having a sense that generally the thing

1 that they might attribute a particular effect to
2 could not have occurred. So that's called
3 general causation, and that is where I'm
4 referring to.

5 Q. Okay. And then you go on to talk
6 about synergism.

7 Do you see that in the next
8 sentence?

9 "The studies specifically support
10 the association" ... and then "synergism"?

11 A. Oh, there it is. I was looking at
12 the wrong paragraph. I'm sorry.

13 Q. What do you mean by synergism,
14 Dr. Michaels?

15 A. Well, substances that are not
16 acting alone are acting in concert with other
17 substances, and those can be acting simultaneous
18 and they can be acting sequentially. And so
19 they all exert an effect that would be called a
20 group effect or a synergistic effect. That's
21 what I'm referring to.

22 Q. Okay. And what synergisms do you
23 see as relevant to the dermatology outcomes in
24 the Flint water crisis?

1 Could you explain that.

2 A. Well, when you have multiple
3 factors in the water that are individually
4 capable of causing rashes, they can probably
5 cause rashes when put together at concentrations
6 individually lower than what would be required
7 if they were acting alone.

8 Q. Okay. And in the dermatology
9 context, what is your basis for -- let me strike
10 that.

11 In the toxicology or epidemiology
12 context, what is your basis for applying this
13 concept of synergism to the case at hand?

14 A. Well, it falls into the category
15 of things where -- of cases where multiple
16 factors are acting at the same time. And,
17 therefore, it's an important consideration.

18 I've cited an EPA study which
19 explicitly says that, just not in this
20 paragraph.

21 Q. Okay. And what are the observed
22 synergisms for the Flint water crisis in your
23 view?

24 A. Whatever is my view has been

1 presented here. I don't have offhand an
2 additional answer to that. I'm not exactly sure
3 what you're getting at.

4 Q. Sure. Let me try to clarify.

5 For example, is it high water
6 hardness and the presence of pH variability that
7 you believe is the issue or the causal
8 connection between water quality and rash
9 outcomes?

10 A. I believe I explicated my causal
11 concern in my report, and I could find exactly
12 where I said that. That would certainly be a
13 subcategory, but that's a small subcategory.

14 Q. Okay. And is there empirical
15 proof that you can point to that that, you know,
16 particular synergy could cause rash outcomes
17 either in Flint or elsewhere?

18 A. I don't think I've referred to a
19 particular synergy. I'm not sure what you're
20 getting at.

21 Q. Yeah. Okay. Well, I mentioned
22 high hardness in the presence of varying pH and
23 alkalinity as an example. So let's just run
24 with that.

1 And you said that that was a
2 possible synergy, correct?

3 A. I said that those were two factors
4 that would contribute -- along with all the
5 other factors in contributing to the idea that
6 these are not substances or stressors that are
7 acting alone.

8 Q. Okay. Can you just survey for us
9 the range of factors that you're referring to.

10 What I'm wondering really is, is
11 it just the three water constituents or
12 qualities that you've mentioned previously,
13 hardness, free chlorine, pH alkalinity, or is it
14 something more than that? That's what I'm
15 trying to figure out.

16 A. Yeah, it's something more than
17 that. It includes those things, and I
18 actually -- I actually think that the UCG report
19 might have done better to include other things
20 that I would include, including -- and maybe it
21 has in some way. It has, actually.

22 It talked about metals for
23 example, and that's one of the main things that
24 I would add, organics.

1 I tried to make that distinction
2 in our deposition, if you recall, when you asked
3 me about the definition of hardness. And I
4 said, well, I used it the way UCG used it. But,
5 in fact, it was more of a colloquialism that it
6 includes anything that's in the water, not pure
7 water.

8 And that is more along the lines
9 of something you don't see in the New York Times
10 or in a popular publication, but it's total
11 dissolved solids. And, in fact, the substances
12 don't all have to be dissolved. They could
13 be -- they could be suspended in the water as
14 well. So I consider that to be a little narrow.

15 So all of those are potential
16 sources of synergism, and I have explicated that
17 in my report. I could show you where. It's
18 just maybe not in this introductory portion.

19 Q. Okay. Is there an epidemiology
20 literature that you can point me to that
21 supports this theory of synergism that you are
22 describing?

23 A. Yes.

24 Q. And what -- can you cite what the

1 lead article or --

2 A. I did. I said to you that the
3 U.S. EPA talks about the importance of
4 conserving synergism. And I can tell you that
5 when you look at that report, it contains more
6 than 51 citations of things that support that
7 concept. It's pretty thorough.

8 And I'm sure that in response to
9 your other question, is it complete, are there
10 other things out there, yes, I'm sure there's
11 that too. But the fact is that that is
12 certainly supported in the literature.

13 Q. Okay. Is that U.S. EPA guidelines
14 for health risk assessment of chemical mixtures?

15 A. Yes.

16 Q. Okay. And that's a 1986
17 publication?

18 A. I don't recall. It might be.
19 It's right there in the back of my report, as I
20 said.

21 Q. Okay.

22 A. One is an EPA citation, but that's
23 the one.

24 Q. Okay. And in your view, that

1 haven't made a request. I will, indeed,
2 follow up and ask about any additional
3 invoices. And if there's anything else
4 we want to talk about after that, let's
5 talk about it that day.

6 MR. RINGSTAD: That sounds fine.
7 And that's what I meant by the request,
8 was really for the invoices, but we'll
9 deal with everything else, as you say,
10 down the line. Thank you.

11 MR. CONNORS: I understand your
12 confusion, and I apologize for that.
13 I think we're on the same page.

14 A. My calculation -- okay. Can you
15 hear me?

16 Q. Yes.

17 A. Okay. My calculation for November
18 through on March is 88.59 hours.

19 Q. Great. Thanks very -- that's much
20 more precise than I expected. Thank you.

21 A. I rounded it off.

22 Q. We'll talk to your counsel about
23 that. We'll check the -- we'll check the
24 invoices. We won't hold you to that number, but

1 thank you.

2 Let's see here. Dr. Michaels, so
3 your March 2023 report was responsive to the
4 four experts, Veolia experts, that you
5 identified that -- Benson, Finley, Gelfand, and
6 Weed. They have all served responses to this
7 report.

8 Have you read those responses?

9 A. Yes, I think -- yeah, I think
10 that's -- yes, yes, of course.

11 Q. Okay. Do you have anything to add
12 to your opinions in response to their responses?

13 MR. CONNORS: Observation; vague
14 and ambiguous.

15 A. I don't recall.

16 I mentioned to you there were
17 physician statements that were not mentioned
18 earlier. I don't -- I don't think there's any
19 new information of that kind.

20 Q. Okay. And you've not reduced
21 anything to writing in that regard in terms of a
22 response to the response, so to speak?

23 A. I have notes of that kind myself.
24 But have I issued something? No, I don't think

1 so.

2 Q. Okay. And what kind of notes do
3 you have?

4 A. I have a list of themes of my
5 responses that I was doing -- I actually am not
6 sure -- I think that may have been derived from
7 my response document. So it may not apply to
8 what your question is, if I have anything else.

9 So, no, I think that was just part
10 of what I looked at to prepare for my deposition
11 today.

12 Q. Okay. But you have notes in your
13 file; is that correct?

14 MR. CONNORS: Objection; vague and
15 ambiguous.

16 A. I have some notes, yes.

17 Q. Okay. And how many pages of notes
18 do you have?

19 MR. CONNORS: Objection; vague and
20 ambiguous as to what you mean by
21 "notes."

22 Q. Well, Doctor, you used the word
23 "notes."

24 What did you mean by notes?

1 A. Well, as I said, I tried to list
2 some themes, and I think I have 15 themes. And
3 I also have two pages of notes that respond to
4 Dr. Jeffrey Brent because I hadn't seen that
5 before. And I told you about some physician
6 quotes. I have some notes relating to those
7 quotes as well.

8 MR. RINGSTAD: Okay. I'm just
9 going to make a request for production
10 of those notes as part of Dr. Michaels'
11 file, and I could put that request in
12 writing, Mr. Connors, if you'd like.

13 MR. CONNORS: Why don't you do
14 that.

15 MR. RINGSTAD: Okay. Sure.

16 BY MR. RINGSTAD:

17 Q. Is it still the case,
18 Dr. Michaels, that you are not offering any
19 opinion that lead in drinking water in Flint was
20 causative of -- or could have been causative of
21 dermatologic outcomes or hair loss?

22 A. Yeah, I have not offered that.

23 Q. Got it.

24 On page 35 of your March 2023

1 report -- I meant to ask about this and skipped
2 over, so sorry for backtracking.

3 But you refer to a "roughly
4 constant Flint population." This is in response
5 7. So you say, "That is, more rashes were
6 observed during the Flint water crisis than
7 after in a roughly constant Flint population."

8 Do you see that?

9 A. Yes, I remember the statement.
10 I'm looking for the actual place where it is.
11 But, yeah I remember it.

12 Q. Let me just guide you to it. It's
13 on page 35 of the March 2023 report.

14 A. Right. Yes, I see that.

15 Q. Okay. It's italicized.

16 Is it your understanding that
17 Flint had a roughly constant population in 2014
18 to 2015?

19 A. No, I didn't -- I didn't --
20 I didn't quantify the population during that
21 period of time. I believe this was a response
22 to Dr. Finley suggesting that the -- that you
23 normally would expect to have more rashes
24 because there's more time.

1 And I was trying to suggest
2 that -- actually, I don't really remember except
3 to say I can look at this response and see what
4 I intended. I don't really remember it that
5 way.

6 Are you talking about response
7 number 7? I don't really see the statement,
8 but -- are you talking about response number 7
9 on that page?

10 Q. Yes. So it's the second to last
11 sentence of that paragraph. It starts, "That
12 is, more rashes," et cetera.

13 A. Oh, yeah, I see that it says
14 contrary to Finley, my comparison before versus
15 after is conservative, that is, more rashes were
16 observed during the Flint water crisis after --
17 than after in a roughly constant Flint
18 population.

19 It's conservative in part because
20 populations and, therefore, potential rashes
21 tend to increase. So I don't know. It's a
22 small factor, but I do see that I mentioned
23 that.

24 Q. Okay. What I'm asking you is, do

1 you know whether Flint's population was
2 increasing or decreasing or staying the same in
3 that time period, 2014, 2015?

4 A. No, I don't have information about
5 the population.

6 Q. Okay. And do you know whether
7 that was the general trend of Flint population
8 over the longer period of time, say, from, you
9 know, 2005 to 2015?

10 A. No. I just know that as a general
11 rule, over time populations tend to increase.
12 And that is all I was suggesting, that there
13 might have been an increase.

14 Q. Have you reviewed any water
15 quality data since last we spoke relating to the
16 time period of 2014, 2015 in Flint?

17 A. Not to my recollection, I don't
18 believe so.

19 Q. Okay. Same question for the time
20 period February to October 2015.

21 A. You mean within that Flint --

22 Q. Yeah, within -- yep.

23 A. Well, if I hadn't done it for the
24 whole period, I haven't done it at all.

1 CERTIFICATION

2
3 I, Carol A. Kirk, Registered Merit Reporter and
4 Certified Shorthand Reporter, do hereby certify that
5 prior to the commencement of the examination,
6 ROBERT A. MICHAELS, Ph.D., was duly remotely sworn by
7 me to testify to the truth, the whole truth, and
8 nothing but the truth.

9 I DO FURTHER CERTIFY that the foregoing is a
10 verbatim transcript of the testimony as taken
11 stenographically by me at the time, place, and on the
12 date hereinbefore set forth, to the best of my
13 ability.

14 I DO FURTHER CERTIFY that I am neither a
15 relative nor an employee nor attorney nor counsel of
16 any of the parties to this action, and that I am
17 neither a relative nor employee of such attorney or
18 counsel, and that I am not financially interested in
19 the action.

20
21
22 Carol A Kirk

Carol A. Kirk, RMR, CSR

23 Notary Public

Dated: May 1, 2023